Extent of Krushee Shastra as per Bhrugu Shilpa Samhita

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Abstract: Sage Bhrugu was the first to classify entire Shilpa shastra (Science and Technology in ancient India) into ten sub branches, 32 Vidyas (Techniques) and 64 Kalas (arts or Skills). Krushi shastra (Biological Sciences) is the first shastra (Science). It contains three techniques and 21 skills. The paper presents the extent of Krushi shastra.

Trees & plants, animals & birds and humans all have to go through three processes i.e. birth (Prasav), rearing (Vruddhi) and decay (Mrutyu). Hence this science contains three Vidyas i.e. Vrukshya, Pashu and Manushya Vidya. In modern terminology these are termed as Botany, Zoology and Human Resource science respectively.

0.1 Terms and terminology

- Shilpa - The Sanskrit word has a very wide meaning, other than sculpture or idol. Shilpa includes many articles (things), machines, innovations, metals, and artificial means. Shilpa -The word Shilpa is derived from words Sheel samadhou which mean anything that pleases the mind. Sage Bhrugu has given a definition of Shilpa. In management term, Shilpa is value addition of anything.

> नानाविधानां वस्तुनां यंत्राणां कल्पसंपदा ।
> धातुनां साधनांच वास्तुनां शिल्पसंज्ञीतं॥
>
> भृगुसंहिता

- Shilpashashtra is a science which deals with creation of a Shilpa.
- Shilpasamhita means compilation of rules and procedures related to a particular Shilpa. The exact period in which Shilpa-Samhitas i.e. compilations were made is not known.
- Shilpdyna is one who is a master of Shilpasamhita or an engineer or architect of modern term.

- Vidya- Vidya means a particular technique. One must have both theoretical and practical knowledge of that subject. There are thirty-two Vidyas related to Shilpashashtra.
- Kala - Kala means an art which can be acquired by practice and observation. Even a handicapped person can be expert in a particular art without any theoretical knowledge. There are sixty-four Kalas related to Shilpashashtra.

Sthapati is an Engineer or Architect in charge of construction. Samarangana Sutradhara, which describes characteristics a "Sthapati"

The Sthapati should be well-versed in the science involving the significance of objects to be created and their specifications.

He should know the theory and the practice; he should have the insight and the skill accompanied with procedure.

That person is said to be an expert in workmanship who knows how to sketch the ground plan, draftsmanship, the horizontal and vertical measurements, the details of ground work of the plot, the 14 kinds of sketch lines, the cutting of the logs and stones etc., and seven kinds of circular sections; well finished joining of the joints and proper demarcation of upper, lower and outer lines.

0.2 Scope and extent of Shilpa shastra

Sage Bhrugu divided the entire knowledge related to Shilpa shastra into ten shastra, 32 techniques and 64 skills.

1. Krishi-Biological Sciences
2. Jala-Water Resources
3. Khani-Mining & Metallurgy
4. Ratha-Surface Transport
5. Nauka-Water Transport
6. Vyomayan-Air or Space Transport
7. Veshma-Dwellings
8. Prakaara-Forts and castles.
9. Nagar Rachana-Town planning and
   Yantra-Machines(which is common to all nine shastras

3- Biological Sciences

Trees, animals and humans all have to go through three processes i.e. birth (Prasav), rearing and growth. Hence this science contains three techniques (Vidyas) .Ref. Krushee parashar.

वृक्षाप्रसवारोषण क्रमादिक्रिया कृषी ॥ कृषी पाराशर

Vidyas & Kalas (skills): Biological Sciences (Krushi Shastra) - This includes three Vidyas and twenty-one Kalas as Shown in Table below,

Three Vidyas (Techniques) and twenty-one Kalas (Skills)	
Techniques	**Skills**
1-Vrikshavidya - Plantation	1.Siradyakarshan-Ploughing 2.VriksharohaNa- Tree climbing 3.YawadiKshuvichar- Sugar Making 4.VeNutruNadikruti - Cane arts
2-Pashuvidya - Animal Sciences	5.GajaAshwasarathya-Horse ridding 6.Dugdhadivichar-Dairy 7.Gatishikshya-Animal Training 8.PalyaNkriya- Saddle making 9.Pashucharma-Removal of skins 10.Charmamardawakriya-Leather Tanning
3-Manushyavidya - Human Resources	11.Kshurkarma-Shaving 12.Kanchukadisiwan- Tailoring 13.Gruhabhandadimardan- Cleaning of pots 14.Vastrasamarjan- Laundry 15.Manokul sewa-Amusement 16.NanadeshvarNan-Writing Scripts 17.Shishusanrakshana-.Baby sitting 18.Sayuktadan -Punishment 19.ShayyastaraN- Seting Bed 20.Pushpadigranthan- Flower garlands 21.Annapachana- Food & Nutrition

Brief description of ancient Indian Skills: It is very interesting to note that many of the above 21 skill or arts have nowadays developed fully as advanced braches of agricultural engineering.

1.Siradyakarshan-Ploughing: India is an agriculural country. Ploughing is the first step of agricuture. The cave man learnt the skill of ploughing from anmimals like boars . He developed tools using teeth of boars or elephants. The excavation tools such as pick-axe or crow bars were named after these animals i.e. Varahadant or Ebradant.

Vedas also mentions descriptions of ploughes .

2. VriksharohaNa- Tree climbing: The knowledge of this skill is very essential for picking of fruits like coconut, areca nuts,jackfruits and mangos etc.

3. YawadiKshuvichar- Sugar Making: For ages sugar is being prepared from juice of cane sugar, tady palm, beet root and seeds of barley. Sugar technoloy is now a modern science

4. VeNutruNadikruti –making household articles from babboo, ruttan(cane) or grass.- Bamboo is an eco-friendly building material. For cenuries is is being used for prparation of mats, roofs , mud walls etc.

5. GajaAshwasarathya-Horse ridding- Horses, bulls or elephants were used to transport materials or in the wars. Selection of these animals and their training is an art.

6.Dugdhadivichar-Milk products- Preparation of curd, butter and ghee from milk was an art. This art is known as dairy science.

7.Gatishikshya-Birds Training- Birds were trained to deliver messages and also to move air balloons.

8.PalyaNkriya- Saddle making- A comfortable saddle was necessary for a rider .Saddle making was an art.

9.Pashucharma-Removal of skins- Removal of skins od dead animals is necessary for leather footware, water bags, saddles and reins of horses etc.

10.Charmamardawakriya-Leather Tanning- A raw leather produces a fowl smell and difficult to work with it . Such leather is sofftened by dipping it into solutions and rolling under heavy rollers and then colored. This art has developed into leather technology.

Skills under Sn 11 to 21 come under human resources engineering and hence are not discussed in this paper.

Ancient references and brief description

1-Parashariya Krushee (c. 400 BC) **-** Mainly deals with various species of trees and their healthy growth & Productivity, mentions about 170 species of plants, including herbs, shrubs, and trees. Krishi-Parashara probably is the first ever 'textbook' on agriculture.

The detailed description of agricultural implements, especially the plow, along with measurements of the various parts is a noteworthy feature of the text.

Different parts of the plow are first identified by names, and measurements of each one of them are then prescribed. Emphasis is laid on the quality and strength.

2 - Kashyapiya Krushee Srushti -(A Treatise on Agriculture by Kashyapa) deals with a)Irrigated rice production in India, b) Strong support to agriculture from the ruler, c) Participation of people of all castes and d) Cattle management.

Soil properties, growing pulses on uplands, growing vegetables, fruits, spice crops, Ornamental plants, growing trees, and Laying out gardens are also described in this text.

3-Lokapakara (**For the Benefit of People- a Kannad Text**) **–** This text **deals** with Astrology for rainfall prediction, *Vastu* (architecture) and Water divining.

4-V*rikshayurveda* (**the science of plant life**) -This text deals with Perfumery, Cookery, and Veterinary medicine etc

5-Nuskha Dar Fassal-Falahaf -

The Persian text, written in, around 1650 AD by Dara Shikoh, son of Shah Jahan. It contains a)art of growing about 100 economic plant species b)Trees (fresh fruit, dry fruit, and timber),c) Shrubs of ornamental significance, vegetables, cereals, legumes, oil seeds, and aromatics ,d) transplanting big trees and e) Two water filled pitchers with small holes at the bottom" to provide water-drip to the root system

6-Vrukshya vallabha (Dear to the World: The Science of Plant Life. – The text was compiled by Sri Chakrapani Mishra, around 1577 AD. It includes a) Detection of groundwater, b) Construction of water reservoirs, c) Planting, disorders and treatments, d) plantations inside a fort e) growing horticultural crops and f) Management of their disorders. It contains more advanced information than that given in Vrikshayurveda (1000 AD).

More References

- Krushee Sangrah
- Krushee DarpaN
- Varah (Bruhat) Samhita
- Upwan Vinod
- Harit Samhita
- Mayamatam
- Drum Kalpa
- Mahabharata –Shantiparwa.

Conclusions: From the information presented herein, it can be concluded that,

- The science of Botany originated in India in 400 B.C.
- Ancient Indian texts on Botany are based on scientific knowledge and most of the information is relevant today.
- Many modern techniques such as tissue culture, organic farming, horticulture, germination etc. were first tried and proved in India.
- Ancient Agricultural science, which contain many futuristic ideas, and hence should be taught to Indian students.

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